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[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 121, 125 and 129

[Docket No. FAA-2001-10910; Notice No. 01-12] RP 10/26/01

RIN 2120-AG90

Collision Avoidance Systems

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This document proposes to use airplane weight and performance characteristics to require a collision avoidance system on airplanes operating under part 121, 125, or 129. The current traffic alert and collision avoidance system (TCAS) rules for parts 121 and 125 require use of TCAS based on airplane weight and passenger-seating configuration criteria and, in some cases, combination passenger/cargo configuration criteria. Part 129 uses passenger-seating configuration and the type of airplane power plant. This proposal would require use of a collision avoidance system by all-cargo airplanes for the first time, and would standardize the requirements for all-cargo and passenger-carrying airplanes. In the past, cargo air carriers had small fleets which operated primarily at night. However, the air cargo industry has experienced rapid growth and cargo fleets are expanding. Also, cargo operations are increasingly occurring around the clock and those operations occur in airspace shared with passenger airplanes.

11/1/01 8:45 am 10/31/01 Chris Kunz, 12/31/01 Part 121

Therefore, the FAA is proposing collision avoidance system requirements for certain cargo airplanes to minimize the possibility of midair collisions involving a cargo airplane. In addition, this proposal would standardize the collision avoidance system requirements for part 121, 125, and 129 airplanes.

DATES: Send your comments on or before [Insert date 60 days after date of publication in the Federal Register.]

ADDRESSES: Address your comments to the Docket Management System, U.S. Department of Transportation, Room Plaza 401, 400 Seventh Street SW., Washington, DC 20590-0001. You must identify the docket number [**FAA-2000-10910**] at the beginning of your comments, and you should submit two copies of your comments. If you wish to receive confirmation that the FAA received your comments, include a self-addressed, stamped postcard. RP 10/26/10

You may also submit comments through the Internet to http://dms.dot.gov. You may review the public docket containing comments to these proposed regulations in person in the Dockets office between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. The Dockets office is on the plaza level of the NASSIF Building at the Department of Transportation at the above address. Also, you may review public dockets on the Internet at http://dms.dot.gov.

FOR FURTHER INFORMATION CONTACT: Alberta Brown, Air Carrier Operations Branch, Flight Standards Service, AFS-220,

Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, telephone (202) 267-8321.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. We also invite comments relating to the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

We will file in the docket all comments we receive, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. The docket is available for public inspection before and after the comment closing date. If you wish to review the docket in person, go to the address in the ADDRESSES section of this preamble between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. You may also review the docket using the Internet at the web address in the ADDRESSES section.

Before acting on this proposal, we will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We

may change this proposal in light of the comments we receive.

If you want the FAA to acknowledge receipt of your comments on this proposal, include with your comments a pre-addressed, stamped postcard on which the docket number appears. We will stamp the date on the postcard and mail it to you.

Availability of Rulemaking Documents

You can get an electronic copy using the Internet by taking the following steps:

(1) Go to the search function of the Department of Transportation's electronic Docket Management System (DMS) web page (http://dms.dot.gov/search).

(2) On the search page type in the last four digits of the Docket number shown at the beginning of this notice. Click on "search."

(3) On the next page, which contains the Docket summary information for the Docket you selected, click on the document number of the item you wish to view.

You can also get an electronic copy using the Internet through the Office of Rulemaking's web page at http://www.faa.gov/avr/armhome.htm or the Federal Register's web page at http://www.access.gpo.gov/su_docs/aces/aces140.html.

You can also get a copy by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue SW, Washington, DC 20591, or by

calling (202) 267-9680. Make sure to identify the docket number, notice number, or amendment number of this rulemaking.

Background

Regulatory History

On January 5, 1989, the FAA issued the "Traffic Alert and Collision Avoidance System; Final Rule" (54 FR 940, January 10, 1989), which established requirements for the installation and use of TCAS on passenger-carrying airplanes used under parts 121, 125, 129, and 135. The final rule required part 121 and 125 operators of large airplanes with a passenger seating configuration of more than 30 seats to have TCAS II installed and operational by December 30, 1991. Part 129 operators of turbine-powered airplanes, with a passenger seating configuration of more than 30 seats, were required to install TCAS II in those airplanes by December 30, 1991. Part 135 operators (known at the time as air taxi and commuter operators) and part 129 operators of turbine-powered airplanes, with a passenger seating configuration of 10-30 seats, were required to install TCAS I by February 9, 1995. Part 121 operators of combination cargo/passenger (combi) airplanes, with a passenger seating configuration of 10-30 seats, were required to install TCAS I by February 9, 1995.

During this rulemaking effort, Congress enacted the Airport and Airway Safety and Capacity Expansion Act of 1987 (Public Law 100-223), which among other things, directed the

FAA to require TCAS II by December 30, 1991, on airplanes with a maximum passenger seating configuration of more than 30 seats.

Amendments to the TCAS Rule

In response to concerns that the aviation community could not comply with the statutory schedule for TCAS II equipage, the FAA proposed a modified schedule to phase-in TCAS II installation. Public Law 101-236, enacted on December 15, 1989, allowed the Administrator to extend the deadline for TCAS II installation for no more than 2 years. On April 3, 1990, the FAA amended the compliance schedule for TCAS II installation for part 121, 125, and 129 operators (68 FR 13242, April 9, 1990). The revised phase-in compliance schedule required all affected airplanes to be equipped with TCAS II by December 30, 1993.

In October 1992, the Regional Airline Association petitioned for a temporary exemption and urged the FAA to extend the compliance date for the installation of TCAS I. Because of delays in equipment development and testing, the complexity of the equipment, and requirements for supplemental type certification, the FAA extended the compliance date for installing TCAS I for 1 year to December 31, 1995 (59 FR 67584, December 29, 1994).

On December 12, 1995, the FAA issued the "Commuter Operations and General Certification and Operations Requirements; Final Rule" (60 FR 65832, December 20, 1995), which, in part, required certain part 135 operators to

conduct operations under part 121. The rule affected part 135 operators with airplanes having a passenger seating configuration of 10-30 seats. Before the "Commuter Rule," only combi airplanes were included under the 10-30 passenger seat criteria in § 121.356(b), which required TCAS I. The "Commuter Rule" added passenger airplanes to § 121.356(b) to cover the remaining 10-30 passenger seat airplanes transitioning from part 135 to part 121. In part 135, the TCAS rule for airplanes with a passenger seating configuration of 10-30 seats applies only to turbine-powered airplanes, but in part 121, the TCAS rule applies to all airplanes with a passenger seating configuration of 10-30 seats. Consequently, some piston-powered airplanes with a passenger seating configuration of 10-30 seats that were not required to have TCAS before the "Commuter Rule" were required to have TCAS after the compliance date of that rule. The amendment also revised the TCAS rule by including reference to TCAS I in § 121.356(c), which covers flight manuals.

Current Requirements

Traffic Alert and Collision Avoidance System (TCAS) is a general term for a family of airborne devices that function independently of the ground-based air traffic control (ATC) system and provide collision avoidance protection for a broad spectrum of airplane types. It is designed to serve as a safety back-up to the ATC system.

TCAS I provides proximity warnings to pilots in the form of traffic advisories (TAs), which display the intruding transponder-equipped traffic relative to the TCAS-equipped airplane. Traffic advisories generally include the range, altitude, and bearing of the intruding airplane. Current rules require at least TCAS I on: (1) passenger or combi airplanes with a passenger seating configuration of 10-30 seats operated under part 121, and (2) turbine-powered airplanes with a passenger seating configuration of 10-30 seats operated under part 129 or 135.

TCAS II provides both TAs and recommended vertical escape maneuvers, known as resolution advisories (RAs). Resolution advisories provide pilots with information to change a flight path or prevent a maneuver that could cause insufficient separation between airplanes. TCAS II also coordinates RAs between two TCAS-equipped airplanes (i.e., each pilot would receive an RA that would not conflict with the other RA). Current rules require TCAS II on: (1) large airplanes with a passenger seating configuration of more than 30 seats operated under part 121 or 125, and (2) turbine-powered airplanes with a passenger seating configuration of more than 30 seats operated in the United States under part 129.

The current TCAS requirements for parts 121, 125, and 129 are summarized in the table below:

14 CFR	Classification	Equipment Requirements
121.356(a)	Large airplane, a passenger seating configuration of more than 30 seats, excluding any pilot seat.	TCAS II and a Mode S transponder.
121.356(b)	Passenger or combi airplane, a passenger seating configuration of 10-30 seats, excluding any pilot seat.	An approved traffic alert and collision avoidance system; if TCAS II is installed, it must coordinate with TCAS units that meet TSO C-119.
125.224(a)	Large airplane, a passenger seating configuration of more than 30 seats, excluding any pilot seat.	TCAS II and a Mode S transponder.
129.18(a)(1)	Turbine-powered airplane, a passenger seating configuration of more than 30 seats, excluding any pilot seat.	TCAS II and a Mode S transponder.
129.18(b)	Turbine-powered airplane, a passenger seating configuration of 10-30 seats, excluding any pilot seat.	An approved traffic alert and collision avoidance system; if TCAS II is installed, it must coordinate with TCAS units that meet TSO C-119.

TCAS transmits interrogations that elicit replies from radar beacon transponders in nearby airplanes. The level of protection provided by TCAS depends on the type of transponder the intruding airplane is carrying. For

example, nearby airplanes equipped with a Mode A transponder will provide only range and azimuth information to the TCAS-equipped airplane; whereas, an airplane equipped with a Mode C or Mode S transponder will provide range, azimuth, and altitude information to the TCAS-equipped airplane. Mode S is a more precise transponder because it transmits in 25-foot increments; whereas, Mode C transmits in 100-foot increments. TCAS provides protection only from airplanes with an operating transponder.

Purpose of the Proposal

The FAA promulgated the TCAS rule in 1989 to protect air carrier passengers from midair collisions. This has the added benefit of protecting persons on the ground. Because the cargo air carriers traditionally transported few passengers, operated few airplanes, and operated primarily at night, the FAA determined that those cargo airplanes did not represent a significant risk to passenger-carrying airplanes, which operated primarily during the day.

The FAA recognized that those few cargo airplanes would benefit some from the TCAS requirement for passenger airplanes because transponder-equipped cargo airplanes are displayed to pilots of TCAS-equipped passenger airplanes. Cargo airplanes also benefit because of the large number of passenger airplanes that are equipped with TCAS. In addition, the FAA determined that the cost/benefit analysis and risk level at that time did not support requiring cargo operators to equip their airplanes with TCAS.

In 1987, prior to the TCAS rule, the air cargo industry operated approximately 375 airplanes. Today, cargo air carriers operate approximately 1,150 airplanes and the demand for air cargo services is expected to continue growing at a rate of 5-6 percent per year over the next 10-20 years. The FAA believes that because the U.S. air cargo industry and daytime cargo operations have grown rapidly at high-density hubs, an increased risk of near midair collisions (NMACs) involving cargo and passenger airplanes exists. Furthermore, large total traffic volume and complexity within the National Airspace System (NAS) increase the challenge of maintaining safe separation among aircraft.

On February 6, 1999, a cargo airplane and a passenger airplane were involved in a hazardous situation when they passed within 1 mile horizontally, and 600 feet vertically from each other. The passenger airplane was equipped with TCAS and its pilot took action to avoid the cargo airplane. On March 2, 1999, a NMAC occurred over Salina, Kansas involving two cargo airplanes. Neither airplane was equipped with TCAS and the airplanes passed within an estimated one-half mile horizontal and 0 feet vertical separation of each other. These occurrences illustrate the potential of a collision between cargo and passenger airplanes or two cargo airplanes.

According to FAA data, since the installation of TCAS began, the number of pilot-reported NMACs dropped from 454

reports in 1990 to an all-time low of 194 in 1996. FAA data also disclose that from January 1, 1994, to January 1, 1999, pilots flying cargo airplanes filed four NMAC reports. Two incidents involved Federal Express airplanes, one NMAC involved an Empire Airlines, Inc., airplane, and one involved an Airborne Express, Inc., airplane. The NTSB has reported that no midair collisions involving large all-cargo transport airplanes have occurred. However, the FAA believes that the potential risk exists of a NMAC or a midair collision occurring involving a cargo airplane.

Therefore, the FAA proposes to use airplane weight and performance characteristics to encompass cargo as well as passenger airplanes and to standardize and clarify parts 121, 125, and 129. The FAA believes this would reduce the risk of midair collisions, increasing public safety in the air and on the ground.

Petition for Rulemaking

Summary of the Petition for Rulemaking

The Independent Pilots Association (IPA), representing pilots from United Parcel Service, petitioned the FAA in September 1996 to amend § 121.356 to require TCAS II on transport category airplanes flown in all-cargo, part 121 operations. According to IPA, requiring transport category cargo airplanes to be equipped with TCAS II may prevent collisions between cargo airplanes and between cargo and passenger airplanes operating in the same airspace. IPA maintains that a TCAS II equipage requirement would reduce

the risk of death and serious injury to pilots, passengers of other airplanes, and persons on the ground.

IPA maintains that TCAS has a proven track record in reducing the risk of midair collisions. Further, the FAA has reported to Congress that TCAS provides an additional safety margin against midair collisions. According to IPA, the FAA and the National Air and Space Administration's Aviation Safety Reporting System have received several reports indicating that TCAS II was credited with preventing midair collisions.

IPA asserts that the FAA articulated its belief that TCAS provides a valuable backup to visual collision avoidance, right-of-way rules, and air traffic separation services when it issued the "Notification to Air Traffic Control (ATC) of Deviations from ATC Clearances in Response to Traffic Alert and Collision Avoidance System Resolution Advisories; Final Rule" (60 FR 50676). This rule authorizes pilots to deviate from their ATC clearance to respond to a TCAS RA.

IPA states that the cargo industry has experienced rapid growth over the past 15 years, and the cargo industry's present operations more closely resemble those of the passenger carriers. IPA asserts that cargo air carriers are now operating numerous daytime flights in addition to nighttime flights and share the same airspace with passenger airplanes. IPA states that cargo air carriers operate within a hub and spoke system in which large banks of

flights arrive at and depart from the same airport within a short period of time. IPA believes this contributes to an increased workload for air traffic controllers and is further reason to require on-board collision avoidance for cargo airplanes. IPA also claims that late-night ATC system maintenance, sleep-deprived controllers, ATC computer and communications outages, and the development of the "Free Flight" program are all additional reasons to require TCAS.

Comments on the Petition for Rulemaking

The FAA published a summary of IPA's petition for rulemaking in the Federal Register on October 25, 1996 (61 FR 55230). The FAA received 350 comments in support of the petition, and none opposing it. A copy of the petition for rulemaking and comments received in response to the petition have been placed in the docket.

Commenters included the Air Line Pilots Association (ALPA), Allied Pilots Association (APA), Air Traffic Control Association, Inc. (ATCA), International Brotherhood of Teamsters (IBT), and Airline Professionals Association Teamsters Local 1224 (APAT). The FAA also received comments from 3 individual pilots, 314 pilots employed by Airborne Express, and 28 pilots employed by DHL Airways, Inc. (DHL). In addition, two comments were received from members of Congress, who forwarded correspondence from their constituents.

The APA states that the 1989 TCAS rule excluded small commuter airplanes that operate out of low traffic airports

from the TCAS requirements. The APA also states that the regulation excluded cargo airplanes, which was an oversight. An individual pilot states that the lack of a uniform regulation that includes all transport category airplanes negates some of the safety enhancements gained by the introduction of TCAS. The IBT endorses and supports the FAA's recognition that TCAS is an effective collision avoidance system. The IBT comments that the FAA's confidence in TCAS permits, by regulation (14 CFR § 91.123), pilots to deviate from an ATC clearance in response to a TCAS resolution advisory.

The APAT and ALPA note that the FAA requires sophisticated equipment on cargo and passenger airplanes, such as ground proximity warning systems, airborne weather radar, windshear detection systems, altitude alerters, cockpit voice recorders, and flight data recorders. These commenters add that the safety item not common to passenger and cargo airplane operations is TCAS II. Many commenters generally indicate that the lack of TCAS on cargo airplanes compromises the safety of the traveling public. They state that cargo airplanes share the same airspace as passenger airplanes and that since the requirement to carry TCAS on passenger-carrying airplanes was issued, cargo operations have expanded significantly. The IBT theorizes that an increase in cargo operations increases the statistical probability of a midair collision involving a cargo air carrier.

Airborne Express pilots comment that there are over 700 arrivals and departures of cargo airplanes under control of the Indianapolis Air Route Traffic Control Center between the hours of 11:00 p.m. and 6:30 a.m. According to this group of commenters, these airplanes, which are not equipped with TCAS, fly over densely populated cities and may be carrying hazardous materials. Additionally, the APAT notes that passenger-carrying airplanes often conduct "red eye" flights at night, which may result in an increased risk for collisions. According to APAT, during the hours air carriers conduct "red eye" flights, airplanes often fly at flight levels not typically assigned for the direction the airplane is flying.

Airborne Express pilots and the APAT maintain that certain ATC computer functions are shut down for routine maintenance between the hours of 1:00 a.m. and 5:00 a.m. They argue that at such times, ATC uses its backup computers, which do not have the collision warning system that is installed on the primary computers. As such, the commenters believe that airborne collision avoidance systems are necessary.

The IBT, the APAT, and the Airborne Express pilots addressed the effects of nighttime operations on human circadian rhythms. According to those commenters, pilots and controllers who work at night suffer the effects of the body's circadian low-point, which results in a reduction of mental alertness and performance. Those commenters contend

that it is during such periods that the air traffic facilities also are often shut down for maintenance. According to the commenters, pilots who feel the effects of this circadian low rely heavily on controllers during times of reduced ATC computer functions.

The FAA received several comments regarding the positive effect TCAS has had on rates of midair and near midair collisions. According to the APA, since the requirement to carry TCAS on passenger-carrying airplanes became effective in 1993, FAA statistics disclose a decline in reported NMACs from 38 in 1993 to 20 in 1996. The APAT states that pilot reports of all NMACs have dropped from 454 in 1990 to 240 in 1995.

Other commenters addressed specific fatal midair collisions. The APAT comments that the NTSB found that the collision between a McDonnell Douglas DC-9 and a Piper PA-12 over Cerritos, California, in 1986 might have been avoided if either the pilots or the controller had an automated collision avoidance system available to them. ALPA noted that the use of the see-and-avoid requirement to prevent midair collisions has severe limitations caused by physiological constraints of the human eye, cockpit window configurations, and current ATC procedures. ALPA cited the November 12, 1996, midair collision over India between a Saudi Boeing B-747 and a Kazakh Ilyushin IL-76 as evidence that highly experienced pilots cannot consistently visually detect and avoid traffic threats. In addition, ALPA

indicated that TCAS II equipment may have prevented the accident.

ALPA also comments that ground fatalities do occur as a result of midair collisions. Specifically, ALPA refers to the 1978 midair collision over San Diego, California, which caused 7 deaths on the ground, and the Cerritos midair collision, which caused 15 deaths on the ground.

Regarding general safety issues, DHL pilots, ALPA, APAT, and IBT refer to the FAA's stated goal of "one level of safety." Those commenters indicate that this goal should include equipping cargo airplanes with TCAS. Also, they comment that one effect of the "one level of safety" goal is the requirement for certain commuter operators that formerly operated under the requirements of part 135 to now operate under the requirements of part 121. Those operators have been required to install TCAS in airplanes with a passenger seating configuration of 10 to 19 seats. However, ALPA points out that airplanes with a passenger seating configuration of 30 seats or less are only required to be equipped with TCAS I. ALPA states that TCAS I is an inferior system and does not provide pilots with RAs. According to ALPA, pilots using TCAS I are required to identify visually the "threat aircraft" before initiating avoidance maneuvers. DHL pilots state that all cargo airplanes must be equipped with TCAS if the FAA has a "zero accident" objective.

The FAA received comments stating that requiring TCAS on all transport airplanes would enhance safety and close a "loophole" that does not require cargo airplanes to be equipped with TCAS. The commenters indicate that the "loophole" requires certain passenger-carrying airplanes to carry TCAS, but excludes cargo airplanes from the same requirement.

The DHL pilots note that TCAS II has 360-degree traffic alerting capability in all weather. An individual pilot commented that the pilot of an airplane equipped with TCAS II would not know which direction a non-TCAS II-equipped airplane would turn during a traffic conflict.

Commenters state that the FAA is falling behind Europe and Japan in aviation safety improvements. Some commenters state that in the year 2000, the Europeans and Japanese will require TCAS on airplanes with 30 or more passenger seats, or weighing more than 33,000 pounds.

ALPA states that pilots have found TCAS II to be invaluable when operating in foreign airspace that has marginal ATC services. Commenters express the need for TCAS in North Atlantic operations because of ICAO's initiative to establish Reduced Vertical Separation Minimum (RVSM) in the nonradar environment of the oceanic airspace. ALPA states that the RVSM program reduces vertical separation to 1,000 feet for aircraft operating between 29,000 feet and 41,000 feet. The commenter states that it cannot find any

requirement for TCAS II on those airplanes exercising RVSM privileges.

FAA Response to the Petition for Rulemaking

The FAA believes that this NPRM is responsive to the IPA's petition for rulemaking, although it is broader in scope. Inclusion of airplanes operating under parts 121, 125, and 129 would ensure that airplanes of similar weight and performance capability would be equipped with collision avoidance systems. This action will serve as the FAA's response to the petitioner's request to amend § 121.356.

Congressional Hearing

The U.S. House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Aviation, held a hearing on February 26, 1997, to discuss whether to require TCAS II on cargo airplanes. The hearing also addressed four near midair collisions that occurred in February 1997 and involved military aircraft and passenger airplanes. Individuals from the FAA, NTSB, United States Air Force (USAF), United States Navy (USN), ALPA, Nations Air Express, Inc., Independent Pilots Association (IPA), International Teamsters Airline Division (Teamsters), the National Air Transport Association (NATA), and the Cargo Airline Association (CAA) (formerly known as the Air Freight Association) testified at the hearing. Most witnesses supported requiring TCAS on cargo airplanes. NATA rejected the proposal citing minimal safety increases and an unjustifiable financial burden to air carriers. A

transcript of the hearing and written testimonies submitted by the witnesses are in the public docket.

NTSB Recommendation

On September 9, 1999, the NTSB recommended that the FAA amend §§ 121.356, 125.224, and 129.18. The NTSB cited two NMACs that occurred in early 1999 involving airplanes that were not required to have TCAS II equipment installed. The NTSB recommended that the FAA require all aircraft of 15,000 kilograms (1kg. = 2.2lb.; 2.2 X 15,000= 33,000 pounds) or greater MCTOW, or more than 30 passenger seats, be equipped with TCAS II and an appropriate Mode S transponder.

The NTSB states that a valuable feature of TCAS II is its ability to coordinate escape maneuvers with TCAS II equipment on opposing airplanes. But when two potentially conflicting airplanes are not equipped with TCAS II, avoidance maneuvers chosen by the pilots may be uncoordinated and the two flight paths may continue to converge. The same outcome could result if one airplane is equipped with TCAS II and the other is not equipped with TCAS.

According to the NTSB, a draft implementation plan published by the European Civil Aviation Conference states that by January 1, 2000, passenger and cargo airplanes weighing more than 15,000 kilograms, or configured with more than 30 seats must be equipped with TCAS II to fly within European airspace. Several other countries are implementing similar TCAS requirements.

The NTSB also discusses the developing technology known as ADS-B. It states that although ADS-B may have a future as a collision avoidance system, that is not its primary function and no firm schedule or implementation plan has been established. The NTSB further states that many technical and research issues remain to be resolved before ADS-B can provide anti-collision capability comparable to that of TCAS equipment. A copy of the NTSB's recommendation is included in the public docket.

Recent Legislation

On April 5, 2000, the Wendell H. Ford Aviation Investment and Reform Act (AIR-21) was enacted (Pub. L. 106-181). AIR-21 directs the FAA to require all cargo airplanes of more than 15,000 kilograms MCTOW to be equipped with collision avoidance equipment by December 31, 2002. AIR-21 also provides for an extension of up to 2 years for safety or public interest reasons.

AIR-21 defines collision avoidance equipment as "equipment that provides protection from mid-air collisions using technology that provides cockpit-based detection and conflict resolution guidance, including display of traffic; and a margin of safety of at least the same level as provided by the collision avoidance system known as TCAS II." This proposal is consistent with the statutory definition and mandate.

The Proposal

The FAA is proposing to amend §§ 121.356, 125.224, and 129.18 by changing the applicability criteria for collision avoidance system requirements. Rather than retaining the current passenger-seating configuration criterion to determine applicability, the FAA would use revised weight and performance criteria. As such, this proposed rule would standardize the collision avoidance system requirements for airplanes of similar size and performance capability. It would apply to cargo airplanes and other airplanes that are not required to have TCAS under current regulations.

Turbine-powered airplanes of more than 33,000 pounds maximum certificated takeoff weight (MCTOW) operated under part 121, 125, or 129 would be required to be equipped with TCAS II, or equivalent, and an appropriate Mode S transponder. Turbine-powered airplanes of 33,000 pounds or less MCTOW operated under part 121, 125, or 129 would be required to be equipped with at least TCAS I, or equivalent. All piston-powered airplanes, regardless of weight, conducting operations under part 121 or 125 would be required to be equipped with TCAS I, or equivalent.

This proposal incorporates the NTSB's regulatory recommendation. However, the FAA has excluded piston-powered airplanes of more than 33,000 pounds MCTOW from these proposed TCAS II requirements. The FAA has determined that TCAS I is more appropriate for those

airplanes, considering their reduced performance characteristics.

The FAA's proposal is broader than the NTSB's recommendation. This proposal would require TCAS I on certain turbine-powered airplanes weighing 33,000 pounds or less MCTOW. Finally, the FAA notes that TCAS II and an appropriate Mode S transponder already are required for airplanes with a passenger seating configuration of more than 30 seats and most of these airplanes weigh more than 33,000 pounds MCTOW.

General Discussion of the Proposals

Current Applicability

Current rules require TCAS II on: (1) large airplanes with a passenger seating configuration of more than 30 seats operated under part 121 or 125, and (2) turbine-powered airplanes with a passenger seating configuration of more than 30 seats operated in the United States under part 129.

Part 121 certificate holders operating passenger or combi airplanes, and part 129 turbine-powered airplanes that have a passenger seating configuration, excluding any pilot seat, of 10 to 30 seats must equip those airplanes with an approved traffic alert and collision avoidance system. (Part 125 only applies to airplanes with 20 or more passenger seats.)

Proposed Applicability

This proposed rule would, in part, provide for the installation and use of an appropriate collision avoidance

system on all airplanes used under part 121, and most airplanes used under part 125 or 129. The proposal would standardize TCAS requirements based on airplane performance characteristics (either piston- or turbine-powered) and airplane weight. Although TCAS technology can apply to all aircraft, this proposal would apply only to airplanes. The proposal is not intended to apply to aircraft that are not airplanes (e.g., helicopters).

The FAA intends to eliminate the current passenger-seating threshold test for determining collision avoidance equipage. The passenger-seating configuration criteria excludes cargo airplanes and airplanes with fewer than 10 passenger seats. The FAA has determined that, in the interest of meeting its safety goals, implementing weight and performance capability thresholds for collision avoidance system applicability would better reflect the type of airplanes that should be equipped with a collision avoidance system. As such, this proposed rule would include airplanes that may have been excepted from the TCAS requirements since 1989.

The Weight Threshold

A large airplane (defined in 14 CFR § 1.1 as an airplane of more than 12,500 pounds MCTOW) that has a passenger seating configuration of more than 30 seats is 33,000 pounds or greater. The current TCAS rules have resulted in TCAS II equipage for airplanes of 33,000 pounds or greater MCTOW. Therefore, the FAA's proposal to use a

weight criteria of 33,000 pounds MCTOW for TCAS II requirements does not change TCAS II requirements for the passenger-carrying airplanes.

The 33,000-pound MCTOW threshold is consistent with ICAO's TCAS equipage recommendation, which uses 15,000 kilograms MCTOW (33,000 pounds). The weight threshold would divide affected airplanes into two categories: (1) airplanes that weigh more than 33,000 pounds MCTOW; and (2) airplanes that weigh 33,000 pounds or less MCTOW. In addition, the proposal specifies whether the requirements apply to turbine-powered or piston-powered airplanes.

The FAA recognized that the current TCAS rule language differs among parts 121, 125, and 129, especially in describing which airplanes are covered by the rule. Some of these differences can be standardized. This proposal would standardize those collision avoidance rules to the greatest extent possible. The FAA intends for the proposal to continue to cover all airplanes that currently are covered by the part 121, 125, and 129 TCAS rules.

Part 135

This proposal does not apply to airplanes operated under part 135. In 1995, the FAA transitioned all part 135 commuter air carriers with airplanes having 10 or more passenger seats into part 121, and they are currently required to have TCAS. The transition plan required the part 135 air carriers to meet the TCAS standards in part 121. The only scheduled carriers remaining in part 135

operate are those with 9 or less passenger seats. The NTSB did not recommend requiring collision avoidance equipment for part 135 operators.

While safety may be enhanced by requiring collision avoidance systems on part 135 cargo airplanes, it is appropriate for the FAA to study this issue for possible future rulemaking.

As in all rulemaking proposals, the FAA conducts extensive research to determine which airplanes should be included in any proposed rule. The FAA uses the best available data when developing and justifying new rules. The FAA recognizes that changes to its data may occur as it is updated and that some data may be inconclusive. For that reason, the FAA encourages the public to comment on the scope of the proposed rule, particularly on the airplanes to be covered by the proposed rule.

Equivalent

Unlike the current TCAS rules, this proposal would allow an equivalent system to be used in lieu of TCAS. However, as explained in the section entitled "ADS-B Technology" below, FAA approval would be required. To be considered as an alternative to TCAS, the system must be equivalent to and interoperable with TCAS. The FAA is interested in new technology that could improve safety.

Proposed Requirements for TCAS II, or Equivalent

This proposal would require TCAS II, or an approved equivalent collision avoidance system, on part 121, 125, and

129 turbine-powered airplanes of more than 33,000 pounds MCTOW. In addition, those airplanes would be required to be equipped with a Mode S transponder.

By using the term "turbine-powered airplane," the FAA would exclude piston-powered airplanes from TCAS II requirements, reducing the scope of the current §§ 121.356 and 125.18. The FAA is aware that current §§ 121.356 and 125.18 do not exclude piston-powered airplanes with a passenger seating configuration of more than 30 seats from TCAS II requirements. Several petitioners operating those airplanes requested exemptions from the TCAS II requirements and the FAA denied those requests. Since the 1989 TCAS rule, the FAA has learned that piston-powered airplanes lack the performance necessary to respond to TCAS II resolution advisories. These airplanes (mostly 1940s vintage) generally operate at low altitudes, where airplanes normally have TCAS I, rather than at altitudes, where airplanes normally have TCAS II.

The FAA is aware of piston-powered airplanes operating under part 121 that would be allowed to have less than TCAS II, even though they weigh more than 33,000 pounds MCTOW--the Douglas DC-6 and the Convair CV-240/340/440 series. However, these airplanes may no longer be conducting passenger-carrying operations with more than 30 passenger seats. The FAA believes that some Convairs (e.g., 600-series) converted to turbine engines may still be operating. The FAA specifically requests comments regarding

piston-powered airplanes weighing more than 33,000 pounds MCTOW operating under part 121 or 125 and the reduction of scope of this proposed rule on piston-powered airplanes with a passenger seating configuration of more than 30 seats operating under part 121.

Proposed Requirements for TCAS I, or Equivalent

This proposal would require TCAS I or an approved equivalent collision avoidance system on: (1) turbine-powered airplanes of 33,000 pounds or less MCTOW operated under part 121, 125, or 129; and (2) all piston-powered airplanes, regardless of weight, operated under part 121 or 125. This would capture the remaining part 121 and 125 airplanes not covered under existing TCAS II requirements. Operators would be allowed to equip the affected airplanes with TCAS II, or an equivalent system, in lieu of TCAS I.

Part 129 includes certain piston-powered airplanes that are too small to be operated practically with a collision avoidance system. Such airplanes do not operate at high altitudes or airspeeds. Therefore, TCAS I requirements under part 129 would continue to apply only to turbine-powered airplanes.

This proposal would set forth a new requirement for passenger airplanes operating under part 125 with a passenger seating configuration of 30 seats or less (i.e., 20-30 passenger seats). Unlike parts 121 and 129, part 125 currently does not include TCAS I requirements for those airplanes. The FAA has determined that airplanes of similar

weight, performance capability, and operating environment should be equipped with similar collision avoidance systems. The FAA is aware that this proposal for part 125, similar to part 121, may require a collision avoidance system on DC-6s and Convairs. However, consistent with the TCAS I requirements proposed in part 121, turbine-powered airplanes of 33,000 pounds or less MCTOW, and any piston-powered airplane regardless of weight under part 125 would be required to be equipped with TCAS I.

Plain Language in Government Writing

In response to the June 1, 1998, Presidential memorandum regarding the use of plain language, the FAA re-examined the writing style currently used in the development of regulations. The memorandum requires Federal agencies to communicate clearly with the public. You can find more information about the Presidential memorandum and the plain language initiative at http: www.plainlanguage.gov.

The FAA is proposing amendments to §§ 121.356, 125.224, and 129.18 in a table format. The FAA specifically requests comments on whether these proposed amendments are in clear language, and whether the table format is easy for the reader to understand.

Use of "You" versus "Pilot" or "Certificate Holder"

Under current §§ 121.356, 125.224, and 129.18, the FAA uses the terms "person" and "certificate holder" to indicate who the rule applies to. The FAA proposes to standardize this and use the term "you" to apply to certificate holders

and pilots operating the affected airplanes. Specifically, in part 121, this revision would clarify that the pilots, in addition to the certificate holder, are responsible for ensuring that an airplane meets the appropriate collision avoidance requirements before operating that airplane. Section 91.221(b) of 14 CFR states that "[e]ach person operating an aircraft equipped with an operable traffic alert and collision avoidance system shall have that system on and operating." The FAA would reiterate this responsibility in the proposed collision avoidance rules in parts 121 and 125.

Pilots operating non-U.S.-registered airplanes under part 129 are not required to possess U.S. pilot certificates. Furthermore, foreign air carriers operating under part 129 primarily operate foreign-registered airplanes; therefore, the proposed rule would be applicable only to the foreign air carrier. The term "you" would not mean the pilots.

Compliance Schedule

The FAA proposes that operators be required to equip affected airplanes by October 31, 2003. The Wendell H. Ford Aviation Investment and Reform Act (Public Law 106-181) directs the FAA to require collision avoidance equipment by December 31, 2002, and allows a 2-year extension for safety or public interest reasons. ICAO recommended a compliance date of January 1, 2003.

The FAA determined that a compliance date of October 31, 2003, would provide adequate time for air carriers to schedule the installation of TCAS equipment during a major C or D maintenance check. The FAA chose October 31, 2003, to avoid logistical problems that may occur during the holiday season and to ensure air carriers encounter few complications meeting the compliance date. It would not be the FAA's policy to grant exemptions when this rule is final.

Technical Standard Orders (TSOs)

The FAA issued TSO C-119a for production of TCAS II units, which required all manufacturers to use a version of the collision avoidance system logic designated as TCAS II version 6.02. Use of TCAS II version 6.02 revealed many shortcomings. As a result, the FAA issued Airworthiness Directives (ADs) requiring all operators to upgrade their system logic to version 6.04A Enhanced. Operators were required to comply with the ADs by December 31, 1994. Airplanes currently required to have TCAS II are equipped with version 6.04A Enhanced or version 7.0.

TCAS II version 7.0, manufactured under TSO C-119b, contains several enhancements to surveillance performance and changes to the collision avoidance logic software. Some of the more significant changes include: (1) permitting a reversal of an RA in TCAS-TCAS encounters in which one airplane does not follow its RA, (2) improving performance in multiple airplane encounters, (3) clarifying potentially

ambiguous phrases in aural advisories, (4) adding a horizontal miss distance filter to reduce nuisance RAs, and (5) eliminating false/nuisance TAs in RVSM operations.

TSO C-119b also provides the basis for design approval of the system known as Airborne Collision Avoidance System (ACAS II). ACAS II is the International Civil Aviation Authority (ICAO) designation for the collision avoidance system required by many foreign civil aviation authorities. ACAS II is equivalent to TCAS II version 7.0.

Grandfathering

This proposal would not require a retrofit of TCAS II version 7.0 for airplanes already equipped with TCAS II version 6.04A Enhanced before the publication date of this NPRM. Technology changes rapidly and the FAA attempts to balance the application of new technology with its role to promulgate reasonable regulations. The FAA has a responsibility to apply the latest technology, but it must do so without overwhelming certificate holders with equipment retrofits. Although the FAA desires all TCAS II version 6.04A Enhanced units to be replaced with version 7.0, the FAA proposes to allow operators with airplanes equipped with TCAS II version 6.04A Enhanced to continue to operate those airplanes with that system until the TCAS needs replacement (i.e., can no longer meet TSO standards).

Certificate holders electing or required to install TCAS II on their airplanes would have to install TCAS II version 7.0 on airplanes that do not have TCAS II equipment

before [insert DATE OF publication of the NPRM]. This also would apply to airplanes that are placed on a certificate holder's operations specifications after October 31, 2003.

Certificate holders operating airplanes installed with TCAS II version 6.04A Enhanced before [insert DATE OF publication of the NPRM], would be able to continue to operate those airplanes with that TCAS unit beyond October 31, 2003, until the TCAS unit can no longer be repaired to TSO C-119a standards (version 6.04A Enhanced). At that time, the certificate holder must replace the unit with TCAS II version 7.0. This grandfathering privilege also would apply to those operators that buy, sell, or lease airplanes with existing version 6.04A Enhanced units installed. The FAA expects operators would encounter minimal costs to upgrade existing TCAS II units (version 6.04A Enhanced) to version 7.0. Operators could upgrade many of the existing units with a software change and/or a single chip.

Early Compliance

The FAA is proposing a new paragraph at the end of existing sections 121.356, 125.224, and 129.18, which would apply until the principal revision takes effect November 1, 2003. These new paragraphs apply to all airplanes on which TCAS II is installed for the first time after the publication of the NPRM. These new paragraphs would require that such airplanes be operated with TCAS II, version 7.0. We believe that it would be in the public interest to require that these TCAS units take full advantage of TCAS

II, version 7.0. We note that this would require that operators preparing to comply on November 1, 2003, who install TCAS II, in effect would be required to comply early for that airplane when they first operate the airplane with version 7.0 installed. This operational requirement would include fully trained flight crews for that airplane. We specifically invite comments on this part of the proposal.

Training

All-cargo operators with pilots who have never used TCAS and must now comply with any collision avoidance final rule will have to train their pilots on the use of TCAS. Passenger-carrying operators with pilots who have used TCAS all along will need to train their pilots for differences training between version 6.04A Enhanced and version 7.0. While there are differences between the two versions, most differences are not readily discernible to the pilot. The differences that may be discernible (aural annunciation and display) should be easily understood once pilots are aware of them. Differences training would be required with a minimum of a bulletin to pilots. There are no special markings added by the manufacturer of the TCAS equipment or by the FAA that would make the pilot aware of which version is installed. Airplane operating practices recommended for version 6.04A Enhanced should be continued when operating with version 7.0.

ADS-B Technology

Groups within the aviation industry have urged the FAA and Congress to allow for the development of an alternative collision avoidance system before imposing a requirement that cargo carriers equip their airplanes with TCAS. UPS Aviation Technologies, formerly known as II Morrow, Inc., is developing a technology called Automatic Dependent Surveillance-Broadcast (ADS-B).

ADS-B is intended to support surveillance of aircraft while airborne and on the ground. Surveillance capabilities include primary radar and secondary surveillance radar. Primary radar, a ground-based system, detects actual aircraft location by measuring reflected energy from the target. Secondary surveillance radar, also known as Mode S, interrogates aircraft transponders and determines aircraft location and other information through the reply. ADS-B uses the global positioning system (GPS) and a radio frequency link to broadcast information between aircraft equipped with ADS-B as well as between aircraft and ground-based ADS-B receivers. An aircraft equipped with ADS-B would broadcast its aircraft identification, along with position, velocity, and other time-sensitive surveillance information to other aircraft and would receive the same information from other aircraft. These capabilities are only fully realized when all aircraft in the system have an operating ADS-B system.

ADS-B may have a number of potential surveillance capabilities that may enhance aircrew situational awareness, and provide enhanced surveillance capabilities for ATC where none currently exists (e.g., oceanic airspace and areas not currently under positive control), and may provide a basis for collaborative activities, such as closely spaced parallel approaches. The FAA, UPS Aviation Technologies, ICAO, air cargo operators, manufacturers, and other industry segments have formed a working group referred to as Radio Technical Commission for Aeronautics (RTCA) Special Committee No. 186 (SC-186) to develop standards for ADS-B.

The FAA recognizes that ADS-B is being evaluated as a potential equivalent collision avoidance system to that of TCAS II, and believes that ADS-B technology may be promising as a surveillance tool, providing situational awareness for flight crewmembers. The cockpit display of traffic information also will enhance situational awareness in positive control airspace. However, the FAA believes there are several significant issues that pose challenges to its use as a collision avoidance system and thus its consideration as an equivalent system to TCAS II. Nonetheless, the FAA has structured this proposal to allow the use of ADS-B (or any other future technology) as an alternative to TCAS as long as these challenges are resolved. Any equivalent must be shown to provide the same level of safety and coordinated maneuvers as presently available with TCAS.

The FAA has determined that any equivalent to TCAS II must be interoperable with TCAS II. While ADS-B may provide an opportunity for early detection of traffic, ADS-B has not been developed to provide RAs or to perform coordinated maneuvers with the many TCAS- and transponder-equipped aircraft in the NAS. The current proposed version of ADS-B operates only with ADS-B-equipped airplanes and ground-based ADS-B receivers; whereas, TCAS II-equipped airplanes are afforded collision avoidance protection from other TCAS II- and all transponder-equipped airplanes. ADS-B will allow like-equipped airplanes to be displayed at considerable ranges, although only an airplane equipped with ADS-B will be able to detect another airplane equipped with ADS-B. Considering the worldwide magnitude of TCAS installations and projected increase in TCAS II/ACAS II installations to meet international requirements, a system that is not interoperable with TCAS would require significant costs for the high levels of equipage to realize the safety benefits equivalent to TCAS. For the FAA to accept ADS-B as an alternative to TCAS II, those wishing to make the case for ADS-B before the FAA must fully resolve these issues before the FAA will consider such a proposal.

Airplanes that may be equipped with ADS-B and TCAS II would assign priority to TCAS II as the collision avoidance system of last resort, with ADS-B as part of an airborne surveillance system. The FAA is concerned about the possible display of traffic from multiple sources such as

TCAS II, ADS-B, and Traffic Information Services (TIS). How it is to be displayed and how the data may or may not be fused together into the display are but some of the issues that must be resolved when multiple traffic information is displayed to the flight crew. The problems related to data fusion and the fact that this data may come from avionics certified to different levels may be difficult to resolve. Those wishing to introduce multiple sources of data into the cockpit have the burden of resolving those issues to the satisfaction of the FAA. The FAA currently approves ADS-B for VFR-only flight in a non-radar environment.

The FAA has relied upon independent communication, navigation, and surveillance (CNS) capabilities for decades to provide safety in the NAS. The FAA recognizes that these are not the only components contributing to safety; however, independence of CNS capabilities allows a pilot to complete a flight safely to a destination even with the loss of any one of the airplane's CNS components. For example, with the loss of surveillance, whether it is primary radar or secondary surveillance radar, a pilot can still navigate and report the airplane's position through communications with ATC. This independence is compromised in a system where navigation and surveillance functions are tied to a single system. ADS-B relies on output from on-board navigation systems for position information. This navigation information provides a dependent surveillance system. A failure in the navigation system, whether on-board the

airplane or a broader systemic failure, would result in simultaneous loss of navigation capability and the surveillance function (situational awareness).

Today, TCAS II functions independently from ground-based communication, navigation, and surveillance systems. TCAS II provides its own accuracy and is designed to provide collision avoidance in the event of a mechanical or human operational failure. ADS-B functioning as the method of primary ATC and as a replacement for TCAS II creates a scenario whereby a failure in ADS-B could affect the primary and backup means of separation. Any use of ADS-B as a replacement to TCAS II must be able to address this independence issue and demonstrate other acceptable methods of achieving this redundancy.

The international aviation community also has expressed concern about the potential use of ADS-B data for collision avoidance. The ICAO Secondary Surveillance Radar Improvements and Collision Avoidance Systems Panel/Working Group 2 (SICASP/WG2) forwarded a position paper to RTCA-SC186 on July 31, 1997, on the use of ADS-B data for collision avoidance. The SICASP is responsible to the ICAO Air Navigation Commission for developing and reviewing proposals for operational technical procedures of airborne separation assurance systems, as well as drafting ICAO Standards and Recommended Practices (SARPs) relating to airborne collision avoidance systems and SSR improvements.

The SICASP/WG2 argues that ACAS II (TCAS II version 7.0) is a last resort safety function. Its purpose is to prevent collision when other means of separation assurance have failed. Therefore, it must be independent of those other means of separation assurance because a risk of collision implies a failure in the other means of separation assurance.

SICASP/WG2 states that ADS-B is expected to broadcast an aircraft's navigation data, and that separation assurance could use such navigation data. They further argue that this, however, increases the need for collision avoidance to provide protection that is independent of ADS-B. Where any proposed collision avoidance function is based on ADS-B data, it must be proved that the data and the overall design provide sufficient integrity, reliability and availability, bearing in mind the elements common to separation assurance and collision avoidance.

SICASP/WG2 states that it believes ADS-B can be used to improve ACAS II provided such use does not undermine the present degree of ACAS II independence. The working group states that any new collision avoidance system based on ADS-B would need to:

(i) have the other aircraft fitted with some component (e.g., ADS-B);

(ii) coordinate resolution advisories when both aircraft in an encounter are equipped with ADS-B;

(iii) coordinate with the existing ACAS II; and

(iv) be demonstrated to meet all the performance requirements of ACAS II.

Any proposals to provide ADS-B as a replacement to TCAS II must address the above issues raised by ICAO to the satisfaction of ICAO.

The FAA will continue to support the development of ADS-B and any other technology that has the potential to improve the collision risk reduction, which currently is provided by TCAS II. ADS-B technology is still in a development phase and many of the technical standards for ADS-B have not been developed in the United States or internationally. It is not known when this technology will be fully developed or available to the industry; therefore, its potential is also unknown. Furthermore, the global mandates for TCAS II, NAS modernization and future changes in operations (e.g., Free Flight) provide the impetus for a strong fundamental system that will allow for changes to take place in a manner that does not compromise safety.

In summary, any alternatives to TCAS II deemed to be potential equivalents must demonstrate performance of the same functions and provide interoperability with TCAS II to function in an NAS environment that will exist for many years to come. The FAA believes that TCAS II features such as automated TAs, RAs, and coordinated maneuvers with other TCAS II-equipped airplanes are essential to any collision avoidance system of the future. Also critical is the need to have the largest practicable population of airplanes in

the local sky available to the collision avoidance system so that the maximum amount of protection can be provided. While the FAA today believes that TCAS II may be the only system that can meet these safety criteria, it is willing to support any other systems that meet those same safety criteria. The FAA has always been open to innovative solutions to safety.

Related Activity

Other Countries Requiring Collision Avoidance Systems

Some countries already require, and several countries are moving toward mandating, the installation and use of collision avoidance systems. The Eurocontrol Airborne Collision Avoidance System Policy Task Force completed a policy, which specifies that ACAS II be required for airplanes operating in certain European airspace effective January 1, 2000. The policy requires implementation of ACAS II by all air carriers operating airplanes with more than 30 passenger seats, or weighing more than 15,000 kilograms (33,000 pounds). This policy also requires cargo airplanes to be equipped with ACAS II (TCAS II version 7.0) and applies to any operator entering Eurocontrol-member countries.

Also, France, Germany, and the United Kingdom have issued regulations implementing this policy with the provision that a petitioner may request relief from the rule until March 31, 2001, only if ACAS II equipment is unavailable.

In addition, the Japanese Government recently mandated TCAS operation within its airspace effective January 1, 2001, for all Japanese-registered airplanes with more than 30 passenger seats, or weighing more than 15,000 kilograms. Equipage of other airplanes desiring to fly in Japanese airspace will be achieved through regional agreements.

India mandated TCAS II for all airplanes operating in Indian airspace on January 1, 1999, and Australia has issued regulations requiring TCAS II equipage on airplanes operating in Australian airspace no later than January 1, 2000. Canada currently has rulemaking in progress that contains provisions for installation of TCAS on passenger and cargo airplanes.

TCAS II Version 7.0 for RVSM Operations

The FAA is beginning to plan implementation of Reduced Vertical Separation Minimum (RVSM) operations in U.S. domestic airspace and has considered a preliminary target year of 2004-2005. After a detailed review of implementation costs, benefits and tasks, the FAA will coordinate a firm implementation date with the user community. Federal regulations and ICAO documents base RVSM approval on stringent criteria for altimetry system error, automatic altitude-keeping, altitude alert, and transponders.

RVSM has an effect on TCAS II requirements. The FAA anticipates that when RVSM is implemented in U.S. domestic airspace, those airplanes that are required to be equipped

with TCAS II will be required to upgrade to TCAS II version 7.0, as amended. In oceanic RVSM operations, TCAS II version 6.04A Enhanced has produced unwarranted TAs and, in some slow overtake situations, has produced multiple nuisance TAs. The FAA does not believe this situation will be acceptable in the high-density air traffic environment of domestic RVSM operations in the United States. Further, the FAA also is recommending version 7.0 modification for RVSM operations in oceanic airspace, in the interest of global mandates for TCAS II version 7.0.

Reference Material

Estimating Potential Risk Reduction Associated with TCAS II Equipage of Cargo Airplanes

MITRE Corporation analyzed the relative risk reduction resulting from TCAS II equipage of cargo airplanes. MITRE sampled 14 terminal areas that exhibit significant air cargo activity, but that also include diverse traffic types. Using flight data from each terminal area, MITRE estimated the frequency of encounters between airplanes in different operational categories (cargo, passenger, and general aviation).

By combining the estimates of encounter frequencies with risk reduction factors for TCAS II version 7.0, MITRE (1) compared the risk of a midair collision in a pre-TCAS environment to that existing with equipage of TCAS on passenger airplanes; and (2) estimated the potential risk reduction with TCAS II equipage of cargo airplanes. MITRE

based its safety data for the report only on TCAS II version 7.0. The difference between the risk reduction factors of TCAS II version 7.0 and version 6.04A Enhanced is nonconsequential; therefore, the FAA has determined that the findings in this report are applicable to TCAS II version 6.04A Enhanced.

MITRE estimated that installing TCAS II on passenger airplanes has led to an overall 90-percent reduction in the risk of a midair collision for all airplane types, including cargo airplanes. If cargo airplanes were equipped with TCAS II, the remaining 10-percent reduction of risk of a midair collision could be further reduced by another 3 percent. MITRE estimated that the risk reduction to cargo airplanes alone would be significant. A copy of MITRE's report is in the docket.

Paperwork Reduction Act

Information collection requirements in the proposed amendment to parts 121, 125, and 129 previously have been approved by the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) and have been assigned OMB control No. 2120-0008. The potential paperwork burden is any recordkeeping required to maintain the list of those pilots who have completed training and are certified as to their proficiency on the collision avoidance system operation. These recordkeeping requirements already are covered under

the Paperwork Reduction Report entitled "Operating Requirements; Domestic, Flag, and Supplemental Operations."

Compatibility With ICAO Standards

International Standards and Recommended Practices (SARPs), Annex 6 to the Convention on International Civil Aviation, Part I, seventh edition, July 1998 has the following four recommendations addressing collision avoidance systems:

6.18 Aeroplanes Required to be Equipped with an Airborne Collision Avoidance System (ACAS II)

6.18.1 From 1 January 2003, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15,000 kg. or authorized to carry more than 30 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

6.18.2 From 1 January 2005, all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5,700 kg. or authorized to carry more than 19 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

6.18.3 Recommendation.-All aeroplanes should be equipped with an airborne collision avoidance system (ACAS II).

6.18.4 An airborne collision avoidance system shall operate in accordance with the relevant provisions of Annex 10, Volume IV.

FAA Discussion of ICAO SARPs

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to comply with ICAO SARPs to the maximum extent practicable. If this NPRM is adopted unchanged with respect to the ICAO SARPs, the FAA intends to file a difference with ICAO.
The FAA has reviewed the corresponding ICAO SARPs and has identified the following differences with these proposed regulations.

The FAA believes that ICAO should actively encourage the use of ACAS II and agrees in principle with the SARPs. However, the FAA is concerned that some aspects of the SARPs may be unrealistic. ACAS II is appropriate for large, transport category airliners, which have been successfully using the equivalent (TCAS II) in the United States for several years. However, some small airplanes lack the performance capability to respond to RAs provided by ACAS II (TCAS II version 7.0) and therefore would receive no benefit from the recommendation. The FAA believes that this NPRM provides a reasonable alternative for those airplanes for which ACAS II would be inappropriate. The FAA has considered the aerodynamic capability of certain airplanes and does not agree that ACAS II/TCAS II is the appropriate level for airplanes with 10-30 passenger seats. The FAA

currently mandates TCAS I for those airplanes and has done so for more than 10 years. Many of the 10-30 passenger-seat airplanes currently using TCAS I weigh less than 5,700 kilograms (12,500 pounds). The FAA also has considered the cost of installing equipment that cannot be fully utilized by certain airplanes. The FAA notes, however, that this proposal partially exceeds ICAO SARPs in that the FAA also requires TCAS equipage for those airplanes with a passenger seating configuration of 10-30 seats, instead of 19-30 seats.

The FAA fully desires that all TCAS II/ACAS II users have the latest version (version 7.0) and the FAA believes that TCAS II version 7.0 has additional benefits. However, many airplanes currently required to have TCAS II have had version 6.04A Enhanced installed for several years. As described in the section entitled "Grandfathering," an alternative proposed in this NPRM is to allow airplanes that already are equipped with TCAS II version 6.04A Enhanced to continue using that version until those particular units can no longer be repaired to TSO C-119a standards. Air carriers that are subject to a TCAS II mandate for the first time must equip their applicable airplanes with TCAS II version 7.0. Eventually, airplanes operating under parts 121, 125, and 129 that are required to have TCAS II would be required to be equipped with TCAS II version 7.0 by virtue of the fact that version 6.04A Enhanced units will need replacement in the future.

Economic Evaluation, Regulatory Flexibility Determination, International Trade Impact Assessment, and Unfunded Mandates Assessment

Proposed changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (19 U.S.C. 2531-2533) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Act also requires the consideration of international standards and, where appropriate, that they be the basis of U.S. standards. And fourth, the Unfunded Mandates Reform Act of 1995 (Pub.L. 104-4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation).

In conducting these analyses the FAA has determined that this proposed rule: (1) has benefits that justify its

costs; is "a significant regulatory action," as defined in Executive Order 12866; and is "significant," as defined in the Department of Transportation's regulatory policies and procedures (44 FR 11034, February 26, 1979); (2) would have a significant impact on a substantial number of small entities; (3) would not constitute a barrier to international trade; and (4) would not impose an unfunded mandate on State, local, or tribal governments, or the private sector. These analyses are available in the docket and are summarized below. The FAA invites the public to provide comments and supporting data on the assumptions made in this evaluation. All comments received will be considered in any final regulatory evaluation.

Introduction

This regulatory evaluation examines the economic impacts of a notice of proposed rulemaking to require part 121, 125, and 129 operators to install and use certain collision avoidance systems (CAS) by October 31, 2003. Part 121, part 125, and part 129 passenger airplanes must currently comply with the existing TCAS requirements, which are based, in part, on passenger-seating configuration. The proposed rule extends the collision avoidance system requirements to part 121, part 125, and part 129 all-cargo airplane operations, and to part 125 operators of passenger airplanes configured with 20-30 seats. However, the FAA is not aware of any part 125 operators that conduct passenger

service with airplanes with 20-30 passenger seats that would be affected by this rule.

Benefits

The expected benefit of this rule is a reduction in the risk of midair collisions involving at least one cargo airplane. The risk of midair collisions for the potentially affected operators is very small, not one has occurred since the issuance of "Traffic Alert and Collision Avoidance System; Final Rule" (54 FR 940, January 10, 1989) requiring TCAS on passenger air carrier airplanes. However, the risk of midair collision involving cargo airplanes is real and such a collision could involve a passenger airplane.

The FAA performed a risk assessment in order to approximate the risk reduction that would be provided by this proposed rule. This assessment approximated that there would be a 40 percent chance of at least one Mid-Air Collision (MAC) involving a cargo airplane in U.S. airspace during the next 20 years. This proposed rule would reduce that risk to approximately one percent.

It is estimated that cargo airplanes could experience a reduction in their MAC risk by about 94 percent as compared to the current risk by installing TCAS II.

In addition, if this proposed rule is implemented, it is estimated that passenger airplanes would experience approximately a 17-percent risk reduction, as compared to the present risk.

Costs

Operators of existing all-cargo airplanes that have not been equipped with TCAS and newly manufactured all-cargo airplanes would incur the cost of the proposed rule. Over a 20-year horizon, the present value total cost of the proposed rule is projected to be $176 million. This cost does not include the cost of air carriers that have voluntarily equipped their fleets with TCAS or the costs of airplanes that have been equipped with TCAS because TCAS is required by a foreign government.

The proposed rule would require the installation of TCAS II, or equivalent, only on turbine-powered all-cargo airplanes of more than 33,000 pounds MCTOW (Maximum Certificated Takeoff Weight) which are operated by part 121, 125 or 129 operators. The proposed rule would also require the installation of TCAS I, or equivalent, on other all-cargo airplanes operated by part 121and 125 operators. In general, this would include turbine-powered cargo airplanes of 33,000 pounds or less MCTOW and all piston-powered cargo airplanes regardless of weight.

TCAS II, Part 121 Costs

The three TCAS II manufacturers reported that the average cost of TCAS II elements, as described above, for a transport category cargo airplane is between $130,000 and $200,000. One company indicated that if purchased in quantity, the cost of a TCAS II system would be between $80,000 to $145,000 per airplane. The manufacturers also estimated that it would cost between $50,000 and $70,000

(depending upon the specific airplane model) to install a TCAS II unit on an existing airplane. This results in a possible range of prices for a TCAS II system installed in an existing airplane of $130,000 to $270,000 or an average of $200,000. The actual price would depend on a number of factors including: the type of unit installed, the number of units ordered, whether or not it was necessary to include a display unit in the purchase price, etc. Some airplanes may not need a separate TCAS display unit because the TCAS information can be displayed on an airplane's existing EFIS (Electronic Flight Information Display System).

Based on these reported costs, for cost calculating purposes, the FAA used $211,000 for the initial costs of installing a TCAS II system into an existing airplane. This figure is estimated to include the necessary spare parts inventory.

The three TCAS II manufacturers reported that the TCAS II element costs would be identical for new and for existing airplanes. The FAA estimates that the initial (equipment plus installation) cost per newly manufactured cargo airplane would be $171,000.

In addition to the initial costs of the TCAS II units, the air carriers would also incur annual O&M expenses. The FAA estimates that the annual O&M expenses for TCAS II units to be $1 per flight hour. Based on an estimated utilization rate of 2,000 hours per airplane per year, and the fleet flight hours estimated in Tables VI-1 and VI-2, the FAA

estimates that the total non-discounted O&M expenses for the existing fleet would be approximately $16,000,000 and $6,000,000 for the newly manufactured fleet.

The FAA estimates that the incremental fuel costs resulting in the weight added by the TCAS II System would be approximately $0.36 per flight hour. This results in a total non-discounted incremental fuel cost of approximately $6,000,000 for the existing fleet and $2,000,000 for the newly manufactured fleet.

The FAA estimates that the cost of pilot training would be approximately 0.05 times the cost of the TCAS unit itself. This results in a training cost of approximately $7,000 per unit per year. The total non-discounted cost of pilot training, for the 20 year analysis period, is estimated to be approximately $57,000,000 for the existing fleet and $22,000,000 for newly manufactured cargo airplanes.

The FAA has estimated that the total undiscounted TCAS II costs of the proposed rule, for the existing fleet during the 20 year analysis period, would be approximately $166,000,000 and that the discounted present value of the total costs of the proposed rule, for the existing fleet over the next 20 years, would be approximately $117,000,000.

The FAA has estimated that the total undiscounted TCAS II costs of the proposed rule, for the newly manufactured fleet during the 20-year analysis period, would be approximately $82,000,000 and that the discounted present

value of the total costs of the proposed rule, for the newly manufactured fleet over the next 20 years, would be approximately $40,000,000.

The FAA has estimated that the total undiscounted costs of the proposed rule during the 20 year analysis period would be approximately $248,000,000 and the discounted present value of the total costs of the proposed rule over the next 20 years would be approximately $157,000,000.

TCAS I, Part 121 Costs

The FAA estimates that the undiscounted costs of retrofitting the existing all-cargo fleet with TCAS I would be about $7,000,000.

The FAA estimates that the total non-discounted Operating & Maintenance (O&M) expenses for the existing fleet would be approximately $4,000,000.

The FAA estimates that the total non-discounted incremental fuel cost is approximately $1,000,000 for the existing fleet.

The FAA estimates that the total non-discounted incremental pilot training cost is approximately $7,000,000 for the existing fleet. The FAA estimates that the total undiscounted TCAS I costs of the proposed rule, for the existing fleet during the 20-year analysis period, would be approximately $19,000,000 and that the discounted present value of the total costs of the proposed rule, for the existing fleet over the next 20 years, would be approximately $13,000,000.

The FAA estimates that the total undiscounted costs of the proposed TCAS rules for the part 121 all-cargo fleet during the 20-year analysis period would be approximately $268,000,000 and the discounted present value of the total costs of the proposed rule over the next 20 years would be approximately $169,000,000.

TCAS II, Part 125 Costs

The FAA estimates that the total undiscounted costs of installing TCAS II units on the existing part 125 Commercial Operator Fleet are approximately $4,000,000. The corresponding discounted amount is estimated to be approximately $2,800,000.

It is anticipated that the existing part 125 Commercial Operator Fleet that would require TCAS II installation as a result of this proposed rule would remain at about its current size. Therefore, no forecast of newly manufactured airplanes is provided.

TCAS I, Part 125 Costs

The FAA estimates that the total undiscounted costs of installing TCAS I units on the existing part 125 Commercial Operator Fleet is approximately $6,200,000. The corresponding discounted amount is estimated to be approximately $4,000,000 million.

It is anticipated that the existing part 125 Commercial Operator Fleet that would require TCAS I installation as a result of this proposed rule would remain at about its current size. Therefore, no forecast of newly manufactured

airplanes is provided.

The total estimated costs of TCAS II and TCAS I installations on part 125 commercial operators, as a result of this proposed rule, are estimated to be approximately $10,100,000. The corresponding discounted costs are estimated to be approximately $6,800,000.

Total Incremental Costs of the Proposed Rule

The total estimated non-discounted costs of TCAS II and TCAS I installations on part 121 all-cargo airplanes and part 125 commercial operators that would be required as a result of this proposed rulemaking are estimated to be $278,000,000 over the next 20 years. The corresponding discounted costs are estimated to be approximately $176,000,000.

The costs in this regulatory evaluation are the costs of TCAS II or I, as appropriate, because these are the only collision avoidance systems currently approved by the FAA. However, the proposal would allow for a system equivalent to TCAS II or I to be used. Because no equivalent system currently exists, cost estimates cannot be made for them. However, in a competitive market, should equivalent systems be developed, they should cost no more than the currently available equipment.

Benefit Cost Comparison

A midair collision involving a cargo airplane could result in accident values from under $10 million to potentially hundreds of millions of dollars. In the least

costly case, a cargo airplane could have a midair collision with a general aviation airplane with no collateral damage. A collision with a passenger airplane, with no collateral damage, can result in costs in excess of $300 million. In the event of midair collisions over Los Angeles, San Diego, and other metropolitan areas, significant collateral damage can easily exceed hundreds of millions of dollars. In its risk analysis, prepared for the FAA, MITRE estimated that slightly more than 50 percent of all midair collisions are expected to occur over the suburbs or cities.

A recent incident over mainland China illustrates the potential costs of midair collisions. On June 28, 1999, a British Airways (BA) B-747 carrying 400 passengers to Hong Kong came within 200 meters of a Korean Air B-747 freighter. The BA aircraft received a TCAS Resolution Advisory (RA), the flight crew responded to it, and a collision was avoided. With over 400 people onboard these two airplanes, the estimated dollar loss of such an accident exceeds a billion dollars. This proposed rule is estimated to reduce the risk of a cargo and passenger midair collision by 17 percent. In the United States a DC-10 and L-1011 All-Cargo Airplanes nearly collided in March, 1999.

The FAA believes the above approximated reduction in the very real risk of midair collisions justifies the $176 million present value cost of this rulemaking.

Initial Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA)

establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the RFA requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The RFA covers a wide range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

Under the RFA, the FAA must determine whether or not a proposed rule significantly affects a substantial number of small entities. This determination is typically based on

small entity size and cost thresholds that vary depending on the affected industry. The FAA has conducted the required review and determined that this proposed rule would have a significant impact on a substantial number of small entities. Accordingly, a regulatory analysis was conducted as required by the RFA, and is summarized in this section.

Entities potentially affected by the proposed rule include: scheduled air transportation carriers, air courier services, and nonscheduled air transportation carriers. The FAA used SBA criteria of 1,500 employees or less per firm as the criteria for the determination of a small business.

The FAA estimates that 59 part 121 firms would be affected by the proposed rule. By the SBA criteria, 34 of these firms are small businesses. The FAA estimates that 22 part 125 firms would be affected by the proposed rule. All of these 22 firms are small businesses, under the SBA criteria. In all there are a total of 56 small businesses that would be affected by the proposed rule. Financial information was available for 39 of these firms.

The FAA estimated the impact on small entities in two steps. First, the FAA used a compliance cost per airplane multiplied by the operator's fleet size to obtain the estimated 1-year cost of this rulemaking for each operator. Then the FAA calculated an affordability measure by dividing this cost by the operator's 1998 (parent company) revenues. As 2 percent is often less than the annual rate-of-inflation, the FAA believes that a compliance cost of 2

percent or less is affordable.

Of the 39 firms considered to be small, and for which information was available, nearly 40 percent are estimated to have costs less than 2 percent of annual revenue. For these firms the FAA believes compliance is affordable. For the remaining 60 percent of the firms with annual costs greater than 2 percent, and perhaps for firms where financial data was not available, the impact of this proposed rule ranges from affordable to significantly negative. No impact is likely for some part 125 operators, as those firms may choose not to operate for hire. By part 125 regulation, these firms already can not solicit business.

Nearly all of the firms considered to be small entities and with an affordability measure greater than 2 percent appear to operate in markets with little or no competition. These markets require very specialized service such as remote air delivery service. Of the 18 part 121 (Group 2 operators ≡ part 121 all-cargo air carriers operating turbine-powered airplanes of 33,000 pounds or less MCTOW and piston-powered airplanes regardless of weight) only 2 were headquartered in the same city and most were located in remote locations. All of the part 125 operators, by regulation, provide non-competitive services. Part 125 operators are restricted from offering for-hire services to the public, such as advertising or marketing. To provide for-hire services, these operators must, in effect, have the

customer find them. Thus in terms of competition, this rulemaking is expected to have a minimal competitive impact.

Relative to larger air cargo operators, smaller air cargo operators are likely to be disproportionately impacted by this rulemaking. Large cargo air carriers are expected to incur costs, which are a relatively smaller percentage of annual revenue, than those of the smaller cargo air carriers.

Slightly more than 20 firms have compliance costs greater than two percent of their annual revenue. Four part 121 or 125 operators have compliance costs exceeding 10%, but less than 20 percent of their annual revenue. One or more of these firms could potentially face a business closure due to this proposed rulemaking. The FAA does not have sufficient information to provide a more refined estimate of the potential business closures. The FAA has attempted to mitigate the impacts on these firms by considering alternatives, such as extending the compliance deadline for small entities. Alternatives are limited because this rule is basically required by statute. The alternatives are discussed in the full initial regulatory evaluation associated with this rule.

International Trade Impact Assessment

The Trade Agreement Act of 1979 prohibits Federal agencies from engaging in any standards or related activity that create unnecessary obstacles to the foreign commerce of

the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

In accordance with the above statute, the FAA has assessed the potential effect of this proposed rule and has determined that it would have minimal affect on trade-sensitive activities. The proposed rule could affect foreign-owned airplanes operated in the United States under part 129. However, the FAA has determined that this proposed rule would have a minimal impact on international trade because all air-cargo airplanes operating internationally are already, or will very shortly, be required by many foreign governments to be equipped with TCAS II, or its equivalent, by rules requiring its use in other airspaces, such as Eurocontrol's airspace.

Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1532-1538) is intended, among other things, to curb the practice of imposing unfunded Federal mandates on State, local and tribal governments. It requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in a $100 million or more expenditure (adjusted annually for inflation) in any 1 year by State, local, and tribal governments, in the aggregate, or by the

private sector; such a mandate is deemed to be a "significant regulatory action."

This proposed rule does not contain a Federal intergovernmental or private sector mandate that exceeds $100 million in any 1 year. Therefore, the requirements of the Unfunded Mandates Reform Act of 1995 do not apply.

Executive Order 13132, Federalism

The FAA has analyzed this proposed rule under the principles and criteria of Executive Order 13132, Federalism. We determined that this action would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, we determined that this notice of proposed rulemaking would not have federalism implications.

Environmental Analysis

FAA Order 1050.1D defines FAA actions that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental assessment or environmental impact statement. In accordance with FAA Order 1050.1D, this proposed action qualifies for a categorical exclusion.

Energy Impact

The energy impact of the ~~notice~~ has been assessed in accordance with the Energy Policy and Conservation Act

(EPCA) Public Law 94-163, as amended (42 U.S.C. 6362) and FAA Order 1053.1. It has been determined that the ~~notice~~ is not a major regulatory action under the provisions of the EPCA.

List of Subjects

14 CFR Part 121

Air carriers, Aircraft, Airmen, Aviation safety, Charter flights, Reporting and recordkeeping requirements, Safety, Transportation.

14 CFR Part 125

Aircraft, Airmen, Aviation safety, Reporting and recordkeeping requirements.

14 CFR Part 129

Air carriers, Aircraft, Aviation safety, Reporting and recordkeeping requirements, Security measures.

The Proposed Amendment

In consideration of the foregoing, the Federal Aviation Administration proposes to amend parts 121, 125, and 129 of Title 14, Code of Federal Regulations as follows:

PART 121 -- OPERATING REQUIREMENTS: DOMESTIC, FLAG, AND SUPPLEMENTAL OPERATIONS

1. The authority citation for part 121 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 40119, 41706, 44101, 44701-44702, 44705, 44709-44711, 44713, 44716-44717, 44722, 44901, 44903-44904, 44912, 46105.

2. In § 121.356, revise the section heading and add

paragraph (d) to read as follows, effective on the date of publication of the final rule in the Federal Register:

§ 121.356 Collision avoidance system.

* * * * *

(d) If TCAS II is installed in an airplane for the first time between [INSERT 30 DAYS AFTER PUBLICATION DATE OF THIS NPRM] and October 31, 2003, you must operate that airplane with a TCAS II that meets TSO C-119b (version 7.0), or a later version.

3. Section 121.356 would be revised, effective November 1, 2003, to read as follows:

§ 121.356 Collision avoidance system.

Effective November 1, 2003, any airplane you operate under this part must be equipped and operated according to the following table:

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate any...	**then you must operate that airplane with...**
(a) Turbine-powered airplane of more than 33,000 pounds maximum certificated takeoff weight	(1) A Mode S transponder that meets Technical Standard Order (TSO) C-112, or a later version, and one of the following approved units-
	(i) TCAS II that meets TSO C-119b (version 7.0), or a later version.
	(ii) TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before [insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be repaired to TSO C-119a standards,

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate any...	then you must operate that airplane with...
	it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version. (iii) A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version.
(b) Turbine-powered airplane of 33,000 pounds or less maximum certificated takeoff weight	(1) TCAS II that meets TSO C-119b (version 7.0), or a later version. (2) TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before [insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be repaired to TSO C-119a standards, it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version. (3) A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version. (4) TCAS I that meets TSO C-118, or a later version. (5) A collision avoidance system equivalent to TSO C-118, or a later version.
(c) Piston-powered airplane, regardless of weight	(1) TCAS II that meets TSO C-119b (version 7.0), or a later version. (2) TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate any...	then you must operate that airplane with...
	[insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be repaired to TSO C-119a standards, it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version. (3) A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version. (4) TCAS I that meets TSO C-118, or a later version. (5) A collision avoidance system equivalent to TSO C-118, or a later version.

PART 125 ▪ CERTIFICATION AND OPERATIONS: AIRPLANES HAVING A SEATING CAPACITY OF 20 OR MORE PASSENGERS OR A MAXIMUM PAYLOAD CAPACITY OF 6,000 POUNDS OR MORE; AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

4. The authority citation for part 125 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701-44702, 44705, 44710-44711, 44713, 44716-44717, 44722.

5. In § 125.224, revise the section heading and add paragraph (c) to read as follows, effective on the date of publication of the final rule in the Federal Register:

§ 125.224 Collision avoidance system.

* * * * *

(c) If TCAS II is installed in an airplane for the first time between [INSERT 30 DAYS AFTER PUBLICATION DATE OF THIS NPRM] and October 31, 2003, you must operate that airplane with a TCAS II that meets TSO C-119b (version 7.0), or a later version.

6. Section 125.224 would be revised, effective November 1, 2003, to read as follows:

§ 125.224 Collision avoidance system.

Effective November 1, 2003, any airplane you operate under this part 125 must be equipped and operated according to the following table:

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate any...	then you must operate that airplane with...
(a) Turbine-powered airplane of more than 33,000 pounds maximum certificated takeoff weight	(1) A Mode S transponder that meets Technical Standard Order (TSO) C-112, or a later version, and one of the following approved units-
	(i) TCAS II that meets TSO C-119b (version 7.0), or a later version.
	(ii) TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before [insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be repaired to TSO C-119a standards, it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version.

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate any...	then you must operate that airplane with...
	(iii) A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version.
(b) Turbine-powered airplane of 33,000 pounds or less maximum certificated takeoff weight	(1) TCAS II that meets TSO C-119b (version 7.0), or a later version. (2) TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before [insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be repaired to TSO C-119a standards, it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version. (3) A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version. (4) TCAS I that meets TSO C-118, or a later version. (5) A collision avoidance system equivalent to TSO C-118, or a later version.
(c) Piston-powered airplane, regardless of weight	(1) TCAS II that meets TSO C-119b (version 7.0), or a later version. (2) TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before [insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate any...	then you must operate that airplane with...
	repaired to TSO C-119a standards, it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version. (3) A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version. (4) TCAS I that meets TSO C-118, or a later version. (5) A collision avoidance system equivalent to TSO C-118, or a later version.

PART 129 ▪ OPERATIONS: FOREIGN AIR CARRIERS AND FOREIGN OPERATORS OF U.S.-REGISTERED AIRCRAFT ENGAGED IN COMMON CARRIAGE

7. The authority citation for part 129 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40104-40105, 40113, 40119, 41706, 44701-44702, 44712, 44716-44717, 44722, 44901-44904, 44906.

8. In § 129.18, revise the section heading and add paragraph (c) to read as follows, effective on the date of publication of the final rule in the Federal Register:

§ 129.18 Collision avoidance system.

* * * * *

(c) If TCAS II is installed in an airplane for the

first time between [INSERT 30 DAYS AFTER PUBLICATION DATE OF THIS NPRM] and October 31, 2003, you must operate that airplane with a TCAS II that meets TSO C-119b (version 7.0), or a later version.

9. Section 129.18 would be revised, effective November 1, 2003, to read as follows:

§ 129.18 Collision avoidance system.

Effective November 1, 2003, any airplane you operate under part 129 must be equipped and operated according to the following table:

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate in the United States any...	**then you must operate that airplane with...**
(a) Turbine-powered airplane of more than 33,000 pounds maximum certificated takeoff weight	(1) A Mode S transponder that meets Technical Standard Order (TSO) C-112, or a later version, and one of the following approved units-
	(i) TCAS II that meets TSO C-119b (version 7.0), or a later version.
	(ii) TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before [insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be repaired to TSO C-119a standards, it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version.
	(iii) A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A

Airplane Criteria and Required Collision Avoidance Equipment

After October 31, 2003, if you operate in the United States any...	then you must operate that airplane with...	
		Enhanced), or a later version.
(b) Turbine-powered airplane of 33,000 pounds or less maximum certificated takeoff weight	(1)	TCAS II that meets TSO C-119b (version 7.0), or a later version.
	(2)	TCAS II that meets TSO C-119a (version 6.04A Enhanced) that was installed in that airplane before [insert publication date of this NPRM]. If that TCAS II version 6.04A Enhanced no longer can be repaired to TSO C-119a standards, it must be replaced with a TCAS II that meets TSO C-119b (version 7.0), or a later version.
	(3)	A collision avoidance system equivalent to TSO C-119b (version 7.0), or a later version, capable of coordinating with units that meet TSO C-119a (version 6.04A Enhanced), or a later version.
	(4)	TCAS I that meets TSO C-118, or a later version.
	(5)	A collision avoidance system equivalent to TSO C-118, or a later version.

Issued in Washington, DC, on October 24, 2001 .

Ava L. Mims
Acting Director, Flight Standards Service